

### **REMARKS**

This responds to the Office Action mailed on July 27, 2005.

No claims are amended, no claims are canceled, and no claims are added; as a result, claims 1-29 are pending in this application.

### **§102 Rejection of the Claims**

The Examiner has maintained rejection of claims 1-22 and 26-29 as being anticipated by Toy et al. and Vrtis et al. In order to anticipate a claim, a reference must have each and every element claimed. The Examiner relies upon the following passages in the Toy patent to show anticipation: col. 3, lines 52-60; col. 4, lines 22-65; col. 5, lines 1-5 and 20-23 and 41-60; column 6, lines 14-30 and lines 61 through col. 7, line 31. The Applicant's attorney has reviewed these passages and has found only references to an exposed surface made of a single metal or metal alloy uniformly dispersed over a surface. There is no reference in any of the passages cited by the Examiner to "a design effective for bonding to solder and for adhering to polymer in a thermal interface material," as is claimed. The Toy reference describes only homogeneous coatings with no design at all. Furthermore, the Toy reference does not describe even a homogeneous coating that is "effective for bonding to solder and for adhering to polymer in a thermal interface material." The Toy reference discusses only a homogeneous coating that bonds with adhesive and not solder bonding.

Applicant cannot find the citations that the Examiner relies upon to support a claim that the Toy patent anticipates the features of "a design effective for bonding to solder." The Applicant asserts that the Toy patent does not describe or show any "designs" but instead refers to a uniform coating. Furthermore, the Toy reference does not describe or show a coating that "is effective for bonding to solder." There is no reference to solder bonding at all in the Toy patent.

Because the Toy et. al reference does not describe these claimed features, such as a "design effective for bonding to solder," the Toy reference does not anticipate claims 1-22 and 26-29. The Examiner's rejection of the claims 2-22 is not understood at all because the Toy patent does not describe any specific design such as is claimed in the dependent claims.

In citing the the Vrtis et al. patent, the Examiner relies upon passages in column 2, lines 36-47; column 2, lines 66 through column 3, line 18; column 3, lines 14-30; and column 4, lines 6-12. These passages describe a use of organic surface protectant (OSP) to cover a heat spreader. Col. 6, lines 11-14 describes the “invention” as providing “an adhesion promoting layer affording good bonding between polymeric adhesives and metals otherwise having poor direct adhesion.” The patent notes that heat spreaders with surface oxides may adhere poorly to inorganic and inorganic-organic thermal interface materials, TIMs. The patent states that “{O}ne solution is to plate the heat spreader with a gold layer over a nickel layer (“Au/Ni finish”) to protect against corrosion by preventing oxides form forming.” The patent also states that the Au/Ni finish provided an “unsatisfactory solution.”

The Au/Ni finish is described as a gold layer over a nickel layer. Thus, there is no “main body having an exposed surface that is plated or coated with at least two different metals” because the main body having an exposed surface in the Vrtis et al. patent is plated or coated with only one metal, gold or nickel but not both. Furthermore, the Vrtis et al. patent does not describe any coating or plating that forms “a design effective for bonding to solder and for adhering to polymer in a thermal interface material.” No “design” is described or shown. Furthermore, the Vrtis et al. patent admits that the gold layer over a nickel layer did not provide a satisfactory solution. Thus, the applicant asserts that the Vrtis et al. patent does not describe each and every element claimed and cannot then anticipate the claims.

### **§103 Rejection of the Claims**

The Examiner has rejected claims 23 and 24 as being unpatentable in light of Vrtis et al. and Dozier et al. However, the Vrtis et al. patent does not discuss “applying a pre-attached solder to the surface of the heat dissipation device surface contacting the thermal interface material.” The Examiner relies upon “column 2, lines 66 through column 3, line 18.” Presented below is that passage:

“The TIM 45 in FIG. 2 is a solder. In other embodiments, TIM 45 may be of a variety of materials, such as organic, inorganic, or hybrid materials. Inorganic TIMs may include any solder material, e.g., conventional solders such as alloys of zinc and copper, and alloys of tin, e.g., eutectic tin/lead, tin/silver/copper, or tin bismuth. In principle, any metal or metal alloy solder may be used as a solder TIM. Examples of other alloys include Sn/Pb/Ag, Sn/Ag/Cu/Sb, Sn/Zn/Bi, and Sn/Zn. Suitable alloys may be readily obtained from commercial suppliers, e.g.,

Multicore, AIM, and SDK. Organic TIMs generally adhere well to heat spreaders that are not coated, because oxide formation is tolerable. Organic TIMs can maintain good adhesion despite surface oxides on the heat spreader. Organic TIMs may be, e.g., made of polymer. Heat spreaders with surface oxides may adhere poorly to inorganic and inorganic-organic hybrid TIMs, since oxides generally jeopardize inorganic joint adhesion. Inorganic-organic hybrid TIMs may be, e.g., solder-polymer TIMs. For these TIMs, the heat spreader must generally be coated.

The Vrtis et al. patent makes no mention of “pre-attach[ing] solder, as is claimed and as is asserted by the Examiner. The Dozier et al. patent describes “solder balls” but does not describe or suggest that its solder balls could be used to prevent delamination. Column 7 of the Dozier et al. patent describes the solder balls as having use as a surface mount, not in preventing delamination. The Dozier et al. patent does not describe the solder balls as having any relationship to delamination. The Examiner has not provided a citation in either reference that would motivate one skilled in the art to combine references. Thus, the Applicant asserts that neither the Vrtis et al. patent nor the Dozier et al. patent render the claims 23 and 24 obvious.

The Examiner has rejected claim 25 in view of Vrtis et al., Dozier and Kao et al. The Applicant asserts that, for reasons discussed above, the Vrtis et al and Dozier et al. references do not suggest combination and, even if they did, the references would not render claims 23 and 24 obvious. Neither Dozier nor Kao describes an integrated circuit package as is claimed.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6976 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 8th day of September, 2005.

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